

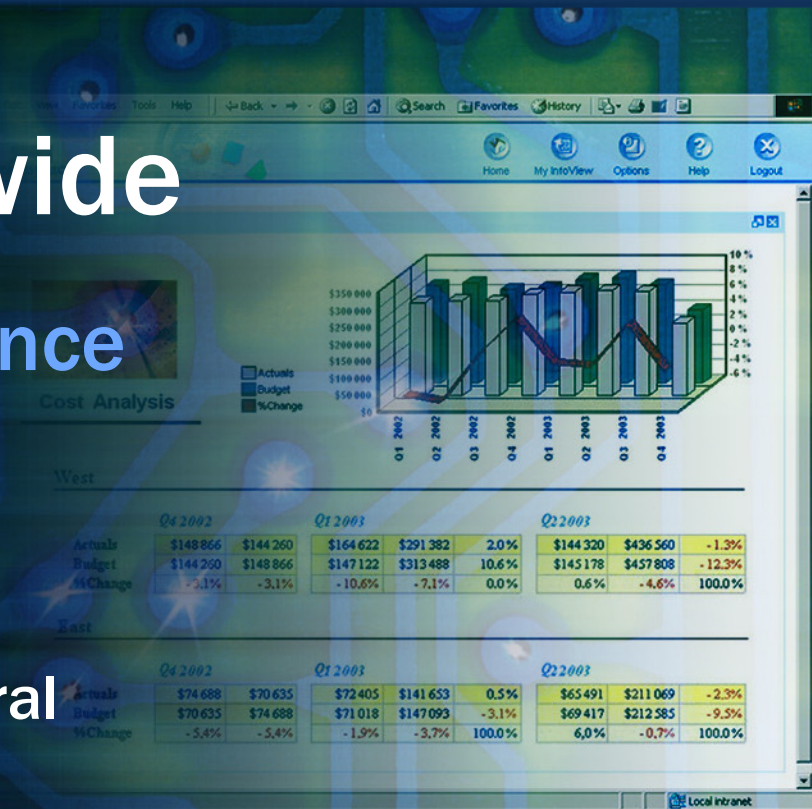
Clinical Data Mining Quickly Identifies Patient Risks Worldwide

2009 Annual HIMSS Conference

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Defense Health Services Systems**

**TRICARE Management Activity
United States Department of Defense
Military Health System**



Learning Objectives

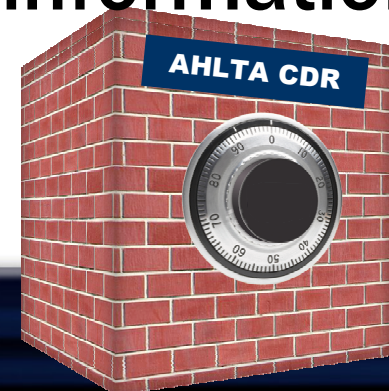
- **Demonstrate the Clinical Data Mart's reporting capabilities**
- **Recognize the dangers of undiagnosed chronic disease**
- **See how automated clinical reporting can improve awareness of undiagnosed chronic disease**

Clinical Data Mart (CDM)

- Serves as the clinical reporting tool for AHLTA, the Military Health System's electronic health record
- Measures, analyzes and manages direct patient care, wellness, prevention, and disease prevention
- Reports AHLTA demographic, symptomatic and diagnostic data

Unlocking Clinical Data

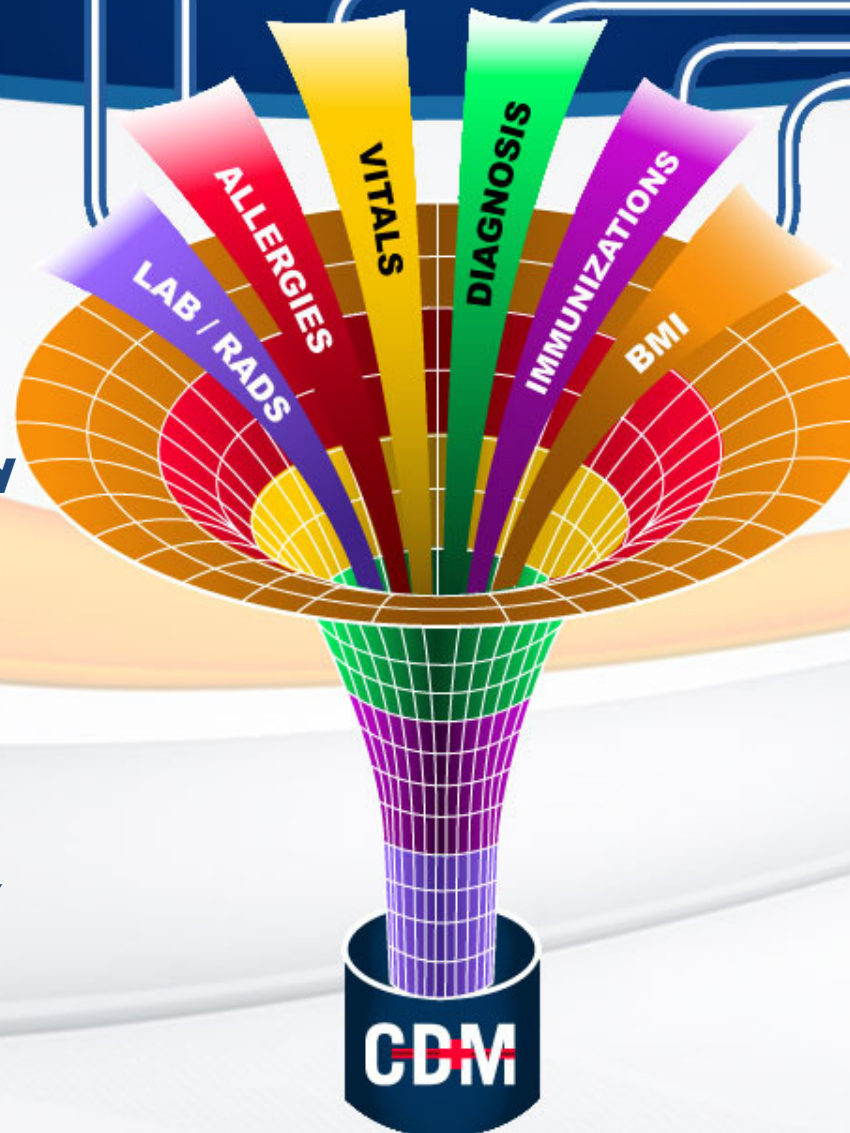
- **Critical need for data captured in AHLTA**
 - ▣ To improve quality, safety, and efficiency of care
 - ▣ To perform outcomes analysis and informed decisions
 - ▣ Measures, analyzes and manages direct patient care, wellness, prevention, and disease prevention
- **CDM is key to turning data into information**



CDM is the Key



- ✓ **Enterprise-wide Data**
- ✓ **Clinical Data Repository (CDR) Data Feed**
- ✓ **Scalable**
- ✓ **Market Leading Business Intelligence Toolset**
- ✓ **Robust Security**



- ✓ **Enterprise**
- ✓ **Service**
- ✓ **MTF**
- ✓ **Clinic**
- ✓ **Provider**
- ✓ **Patient**

CDM Users



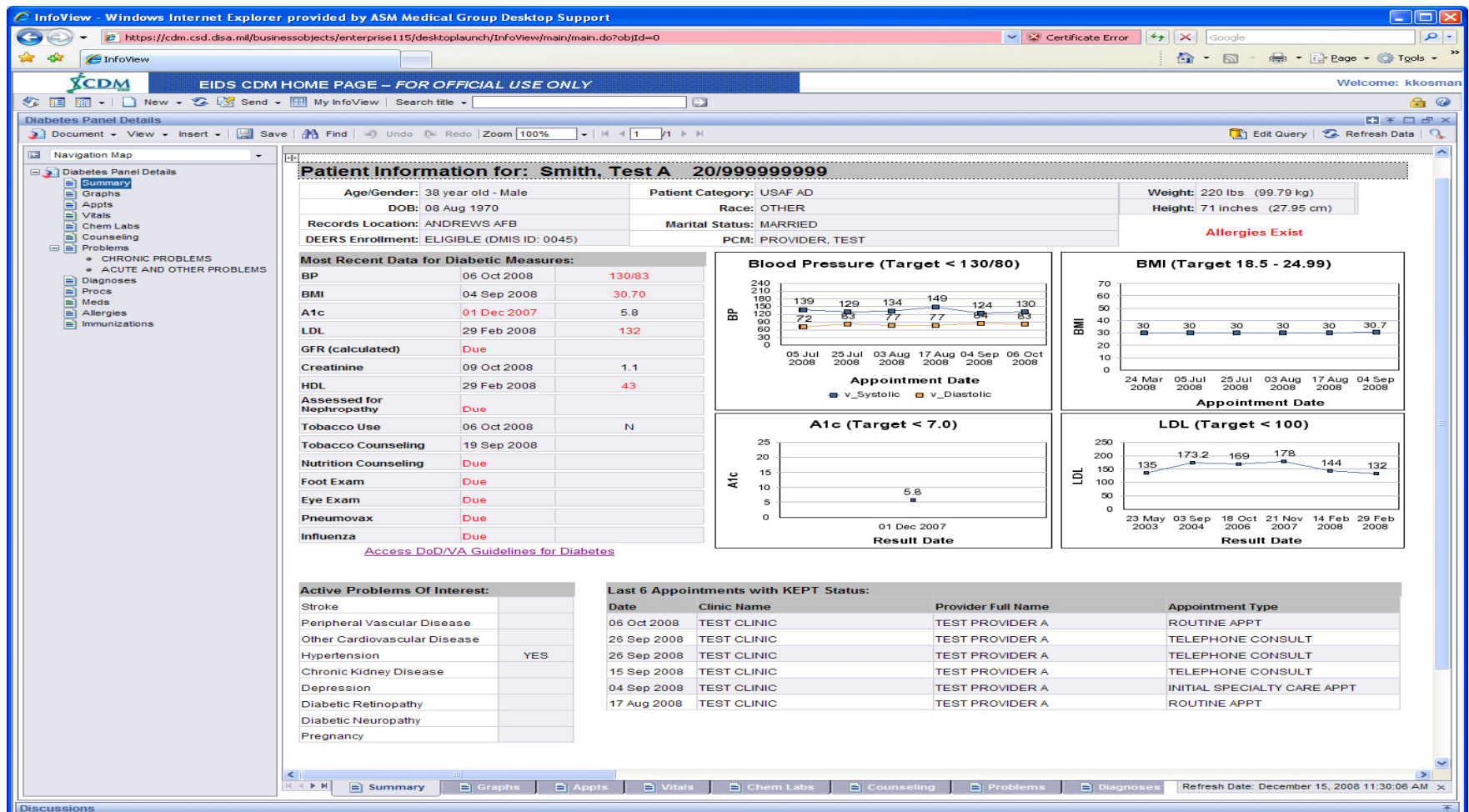
- ✓ Population and preventive health experts
- ✓ Providers
- ✓ Nurses
- ✓ Researchers
- ✓ Clinical support staff
- ✓ Data analysts
- ✓ Clinic administrators

CDM Successes

Army	Navy	Air Force
<ul style="list-style-type: none">✓ Ensured vaccine compliance in high risk groups✓ Improved effectiveness of smoking cessation✓ Identified undiagnosed patients at risk for chronic kidney disease	<ul style="list-style-type: none">✓ Enabled notification to patients at risk from vaccine recall in hours vs. weeks✓ Sparked generation of disease management reports	<ul style="list-style-type: none">✓ Improved clinical documentation✓ Tracked medical readiness✓ Delivered surgical outcomes analysis

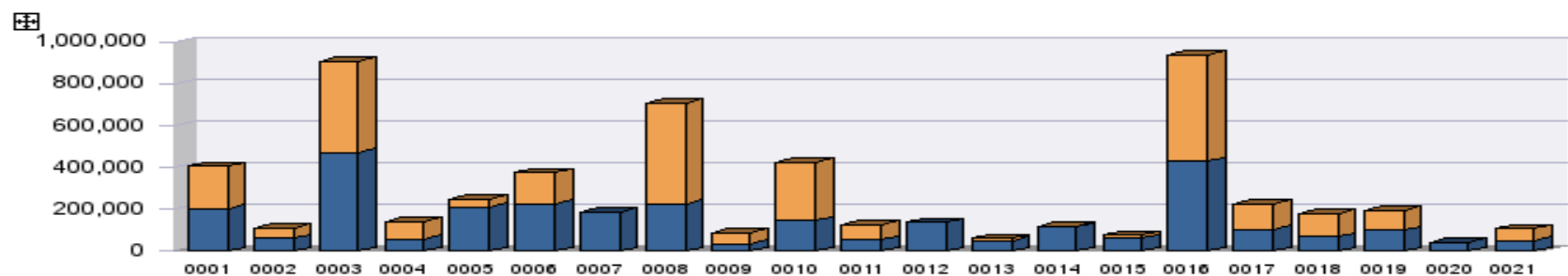
Sample CDM Reports

Diabetes Provider Panel



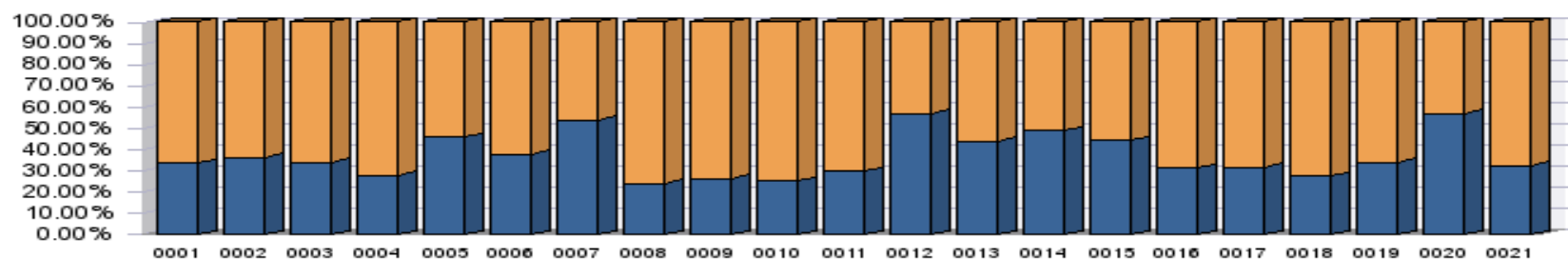
Adult Tobacco Vitals

**Total Number of Adult Tobacco Vitals Taken
as a Percentage of the Total Number of Visits per Navy Parent MTF**



DMIS

■ Total # Tobacco Vitals ■ Total # Appointments



DMIS

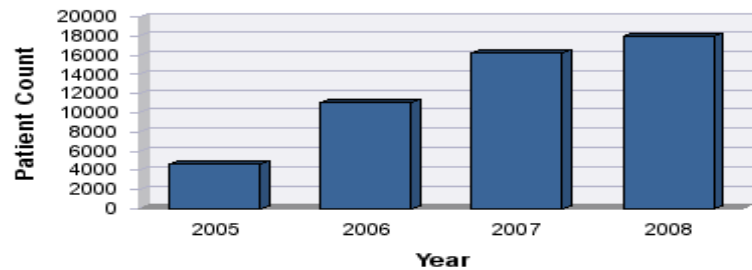
■ Total # Tobacco Vitals ■ Total # Appointments

Post Traumatic Stress Disorder

Posttraumatic stress disorder (ICD9 309.81) Enterprise-wide *Two diagnoses required

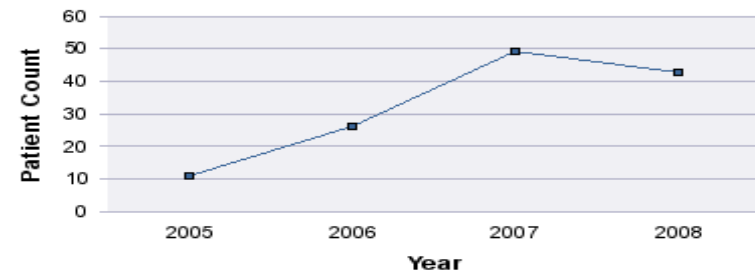
PTSD

Count of distinct patients diagnosed with PTSD.



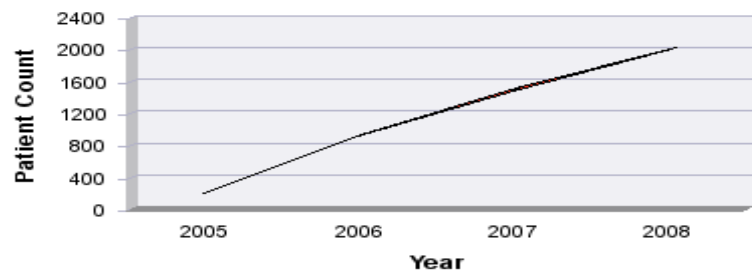
Suicide

Count of distinct patients diagnosed with PTSD and having a suicide attempt (ICD9 code: E950.* to E959.*).



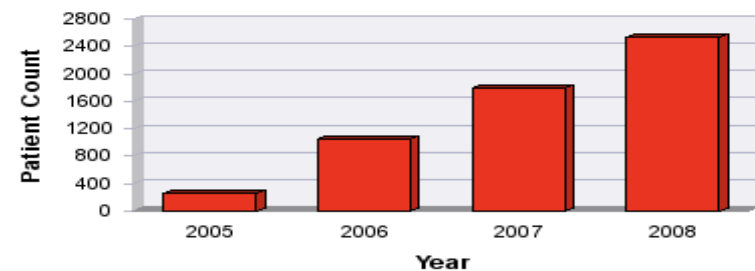
Alcohol

Count of distinct patients diagnosed with PTSD and reporting habitual alcohol use.



Tobacco

Count of distinct patients diagnosed with PTSD and reporting tobacco use.



PTSD findings based on single diagnosis / example of correlating phenomenon

The Value of CDM

***Automated Reporting of
Undiagnosed Chronic Kidney
Disease***

Safety is Key

- **Unrecognized chronic kidney disease a major risk factor**
- **Patients with undiagnosed chronic kidney disease can be inadvertently harmed**
- **Failure to take appropriate precautions puts patients, providers, and institutions at risk**

Published Data on the Dangers of Undiagnosed Chronic Kidney Disease

Assessment of Racial Disparities in Chronic Kidney Disease Stage 3 and 4 Care in the Department of Defense Health System

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^{*}Nephrology Service, National Naval Medical Center, Bethesda, Maryland, and the Uniformed Services University of

Assessment of Racial Disparities in Chronic Kidney Disease in the Department of Defense Health System

American Society of Nephrology, November 9, 2007

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CKD recommended targets (monitoring of recommended laboratory data, prescription of recommended medications, and referral to nephrology) was assessed. We assessed whether race (White, Black, or Hispanic) was associated with receipt of these targets. Results: Among the targets, only measures of compliance with laboratory testing were significantly associated with race. However, patients categorized as Black were significantly less likely to receive these targets. Conclusions: In the DOD health system, Black beneficiaries are less likely to receive recommended laboratory testing and referral to nephrology than White beneficiaries. These findings suggest that Black beneficiaries are at greater risk for poor outcomes than White beneficiaries. Further studies are needed to assess whether race (White, Black, or Hispanic) is associated with receipt of these targets. Results: Among the targets, only measures of compliance with laboratory testing were significantly associated with race. However, patients categorized as Black were significantly less likely to receive these targets. Conclusions: In the DOD health system, Black beneficiaries are less likely to receive recommended laboratory testing and referral to nephrology than White beneficiaries. These findings suggest that Black beneficiaries are at greater risk for poor outcomes than White beneficiaries. Further studies are needed to assess whether race (White, Black, or Hispanic) is associated with receipt of these targets.

Numerous studies have documented that Black beneficiaries experience higher mortality, less access to care, and shorter renal allograft survival compared with White Americans. Some programs aimed at enhancing improvements in this health gap (6).

Received September 20, 2007. Accepted November 9, 2007. Published online ahead of print. Publication date set by ASW G's current affiliation is Nephrology Service, National Naval Medical Center, Bethesda, Maryland.

Disclaimer: The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of Defense, nor the US Government. Correspondence: Dr. Kevin C. Abbott, MPT, National Naval Medical Center, Washington, DC 20307. Phone: 301-462-1000. E-mail: kevin.abbott@usmcmn.mil

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Leading the News

FDA to add black-box warning to two bowel-cleansing prescription drugs.

The AP (12/12, Perrone) reports that on Thursday, the Food and Drug Administration (FDA) stated that it "will add the sternest safety warnings available" -- the so-called black-box warning -- "to prescription drugs used to cleanse the bowel before colonoscopies." The FDA was spurred into action after it "received more than 20 reports of a rare, but serious form of kidney failure among patients taking the drugs, known as oral phosphate products." Consequently, Salix

Pharmaceuticals Inc. (Salix) announced that it will add a black-box warning to its products, OsmoPrep (sodium biphosphate, sodium phosphate) and

FDA Warning December 12, 2008

OsmoPrep (sodium biphosphate, sodium phosphate) will now include a label that "warns that the drugs should be used with caution in older patients, those that suffer from dehydration and kidney disease, or those that take

JASN Express. Published on October 31, 2007 as doi: 10.1681/ASN.2007030349

CLINICAL RESEARCH www.jasn.org

Association of Oral Sodium Phosphate Purgative Use with Acute Kidney Injury

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Association of Oral Sodium Phosphate Purgative Use with Acute Kidney Injury

Journal of the American Society of Nephrology
October 31, 2007

Study. Of 1111 patients who underwent colonoscopy and had serum creatinine values recorded 65 days before and after the procedure, AKI, defined as $\geq 50\%$ increase in baseline serum creatinine, was identified in 114 (10.26%). After adjustment for significant covariates in a multiple logistic regression model, the use of OSP was associated with increased risk for AKI (odds ratio 2.35; 95% confidence interval 1.51 to 3.66; $P < 0.001$) with an adjusted number needed to harm of 81. Age was also independently associated with AKI in this cohort; therefore, until larger, prospective studies define the population at risk for acute phosphate nephropathy, the use of polyethylene glycol-based purgatives should be considered for older patients and possibly for those with comorbid medical conditions.

J Am Soc Nephrol 18: 1026-1031, 2007. doi: 10.1681/ASN.2007030349

Oral sodium phosphate (OSP) solution is commonly used for colorectal cleansing for colonoscopy. A 90-ml dose contains approximately 1 mg/ml of sodium and 11.5 g (4 mmol) of phosphorus. Its use is contraindicated in patients with preexisting renal disease because of the risk of developing renal failure or electrolyte imbalances.¹

[NSAID], angiotensin-converting enzyme inhibitors [ACEI], angiotensin receptor blockers [ARB], and diuretics) have been suggested as possible risk factors for the development of APN after use of OSP purgatives.²

In May 2006, the Food and Drug Administration published an alert regarding the use of this medication.³ They reported 20 additional cases of possible

CDM Patient Distribution by Chronic Kidney Disease Stage

CKD ICD9 Analysis

The top table displays the Study Population Patient Distribution by CKD Stage in the top table. The CKD Stage is based on a calculated eGFR using the following equation: $eGFR = 186 * scr(-1.154) * age(-0.203) * 0.742$ (if female) * 1.210 (if African American).

The bottom tables show the diagnosis distribution for patients in the Study Population. The left table is the distribution for CKD Stage 3 patients. The right table is the distribution for CKD Stage 4 & 5 patients. The ICD9 codes are limited to codes that have an associated description that matches the pattern: %CHRONIC KIDNEY DIS%.

Study Population Patient Distribution by CKD Stage

CKD Stage Description	Patient Count
CKD STAGE 3	50,232
CKD STAGE 4 & 5	6,343
Total:	56,575

Study Population CKD Stage 3 Diagnosis Distribution

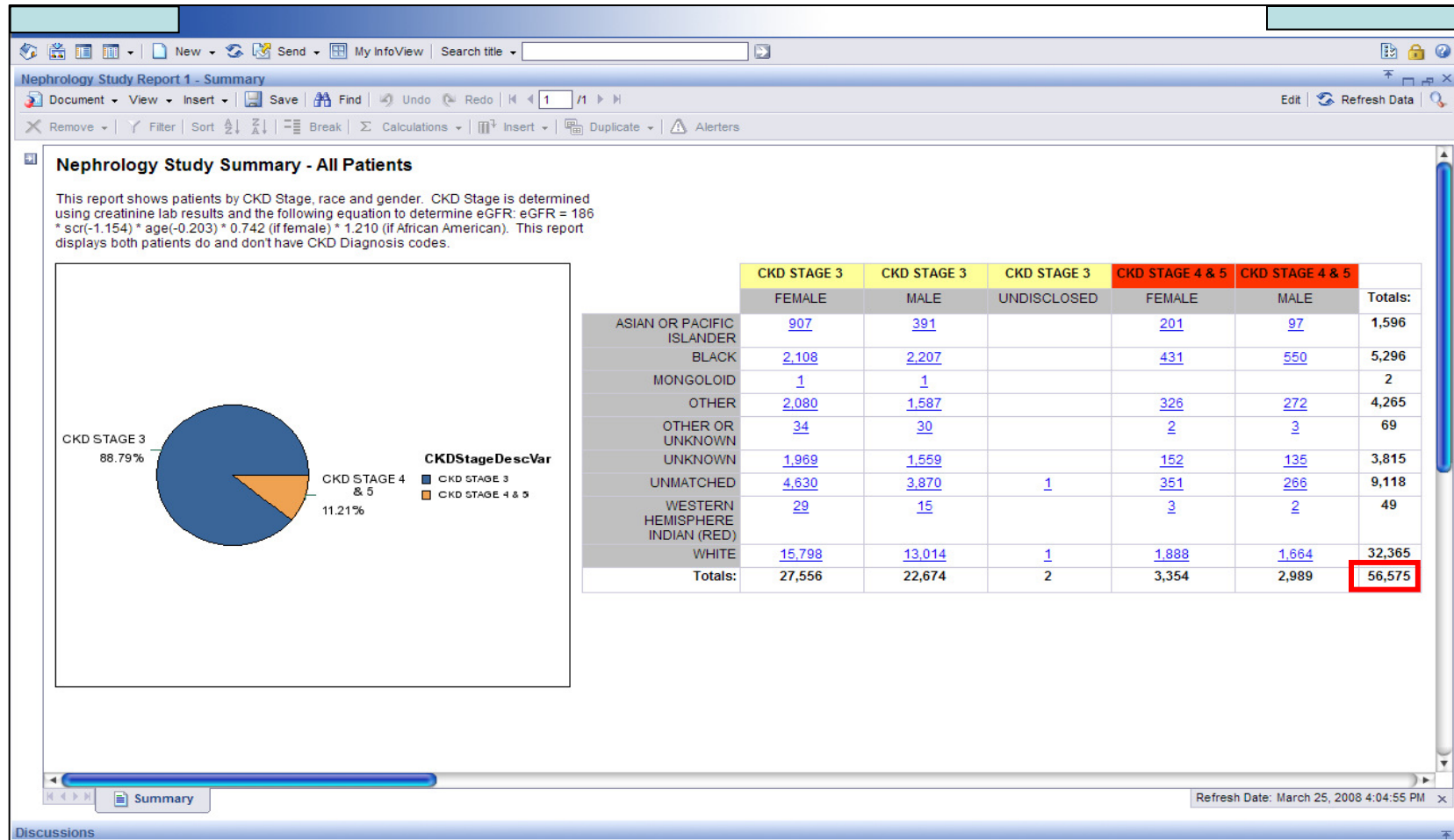
ICD9 Code	Diagnosis Description	Diagnosis Count
	Total:	11,744
250.40	CHRONIC KIDNEY DISEASE DIABETIC	88
250.40	DIABETES WITH RENAL MANIFESTATIONS, TYPE II OR UNSPECIFIED TYPE, NOT STATED AS UNCONTROLLED	50
250.40	DIABETIC NEPHRITIS	42
250.40	DIABETIC NEPHRITIS TYPE II	23
250.40	DIABETIC NEPHROPATHY	439
250.40	DIABETIC NEPHROPATHY TYPE II	394
285.21	ANEMIA IN CHRONIC KIDNEY DISEASE	29
285.21	ANEMIA OF CHRONIC KIDNEY DISEASE	172
285.21	ANEMIA OF END-STAGE RENAL DISEASE	86
285.21	ANEMIA OF END-STAGE RENAL DISEASE ERYTHROPOIETIN-RESISTANT	8
403.00	KIDNEY DISEASE WITH MALIGNANT HYPERTENSION	3

Study Population CKD Stage 4 & 5 Diagnosis Distribution

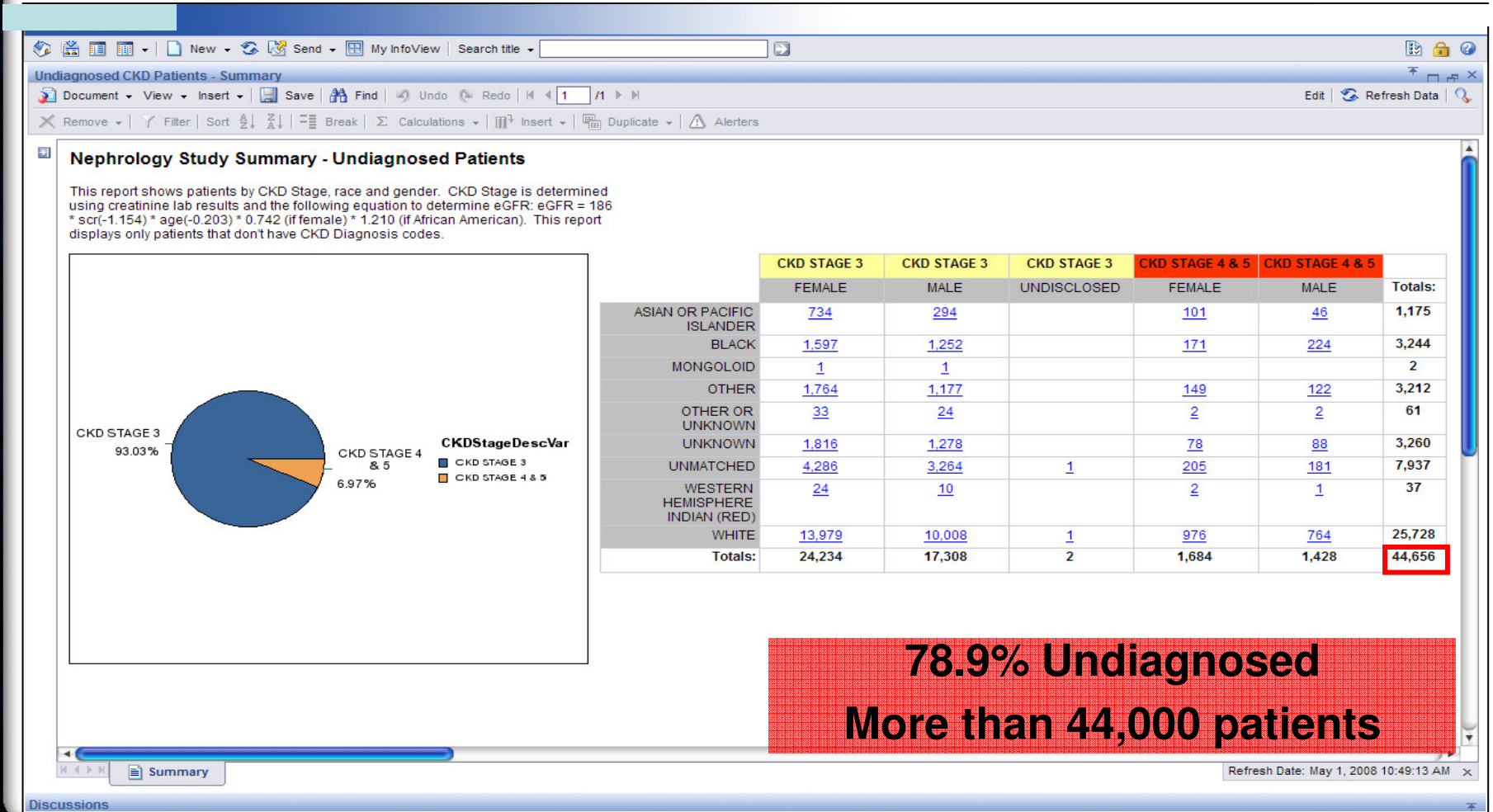
ICD9 Code	Diagnosis Description	Diagnosis Count
	Total:	5,757
250.40	CHRONIC KIDNEY DISEASE DIABETIC	43
250.40	DIABETES WITH RENAL MANIFESTATIONS, TYPE II OR UNSPECIFIED TYPE, NOT STATED AS UNCONTROLLED	28
250.40	DIABETIC NEPHRITIS	16
250.40	DIABETIC NEPHRITIS TYPE II	7
250.40	DIABETIC NEPHROPATHY	189
250.40	DIABETIC NEPHROPATHY TYPE II	200
285.21	ANEMIA IN CHRONIC KIDNEY DISEASE	44
285.21	ANEMIA OF CHRONIC KIDNEY DISEASE	219
285.21	ANEMIA OF END-STAGE RENAL DISEASE	292
285.21	ANEMIA OF END-STAGE RENAL DISEASE ERYTHROPOIETIN-RESISTANT	17
403.00	KIDNEY DISEASE WITH MALIGNANT HYPERTENSION	5

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Nephrology Study All Patients



Undiagnosed Patients At Risk



CDM Data Reporting Worldwide

- Automated clinical mining of electronic health record data is vital to identifying clinical quality indicators
- Clinical reporting is merely one tool of many required to measure, analyze, and manage direct patient care
- Rapidly reporting secure, actionable clinical data is priceless

For More Information

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